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DAIRY OPERATION FLY CONTROL

D-88-01-0429

FINAL REPORT

91-01747/

TERRY DIERKER

DAIRY OPERATION FLY CONTROL

(A.D.F. Demonstration)
D-88-01-0429

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Agri - Enviro Consulting

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ABSTRACT:

To effectively reduce manure fly populations, several control avenues should be incorporated into a season long integrated fly management program. The use of an electrostatic sprayer with a registered insecticide is one effective way of reducing or controlling manure fly populations.

PROJECT OBJECTIVE:

To demonstrate the effectiveness of permethrins for in barn control of flies. To demonstrate the effectiveness of an electro-static sprayer for yard site and shelterbelt control of flies using Cygon (dimethoate).

BACKGROUND

High density livestock confinement production systems or intensive livestock operations are an integral part of Saskatchewan's agricultural economy. Major problems associated with intensive operations are the disposal of manure and the nuisance caused by manure flies (Axtell, 1970). Control of house flies and other filth flies around intensive livestock operations is not a simple task. However integration of control methods that are compatible with the present livestock operation activities will provide effective fly control. Proper manure disposal will reduce the existing breeding areas for manure flies. Controlling adult flies with avaliable insecticidal/ biological control methods would also reduce nuisance fly populations. The overall objective is to lower the fly population to a level that is tolerable for the inhabitants and acceptable for the dairy farm operation.

This project will demonstrate that fly problems can be minimized by utilizing readily available means of fly control.

METHODS:

Initially an evaluation was made of fly densities and populations, breeding areas and areas of congregation. Treatments were conducted inside the barn (permethrin), outside the barn (dimethoate) and along the east side of the road hedgerow (see diagram !).

Evaluations of treatments were determined by the percentage reduction of the 4 main fly species populations.

Method's con't

Monitoring of the number and location of the flies was done with use of sticky traps, both before and after the treatment. Sticky traps were located at 10 sites in the barn, 10 sites around the outside of the barn, 5 sites along the hedgerow that runs parallel to the grid road, and at several sites at the neighbor's home (Messer's) located approximately 350 meters from the barn (see diagram #1).

Mr. Dierker and his family conducted the insecticide applications on July 19, 1988 with the electrostatic sprayer.

RESULTS AND DISCUSSION

Two adjacent Tisdale farms were identified as areas posessing high fly populations, and a program of treatment and evaluation was formulated and carried out.

The little house fly was the major pest species on the Messer's farm (Graph 1 to 4). The Messer family considered the little house fly population to be at intolerable levels at specific periods during the 1988 fly season. The little house fly population on the Messer's farm during treatment evaluation was at a moderate annoyance level.

There were 4 dominant fly species active on the adjacent farms the little house fly , *Fannia canicularis* , house fly, *Musca domestica*, black garbage fly, *Ophyra* spp. , and horn fly, *Haematobia irritans*.

The Dierker dairy farm operation is the probable source of the little house fly. Distribution monitoring on the East side of Dierker's barn did not provide adequate information to locate the breeding sources of the little house fly. There is the possibility of other breeding sources attributing to the little house fly population.

Distribution of house flies indicated they were originating from the manure base located near Dierker's barn. Although there were low house fly populations on both farms, the adult populations were of a level that could create a higher population later on in the season. It is important to note that the fly species and population data collected during July 18 to July 20, 1988, can not be considered indicative of the whole 1988 fly season. Many factors, such as weather and breeding medium, effect fly development and distribution (Legner et al, 1973).

A large population of migrating horn flies, captured along the road hedgerow (Graph 5 and 11), shows the Dierker's dairy operation/ cattle have been producing horn flies. The horn fly population was at a level that may of caused harassment to Dierker's dairy cattle.

Distribution results show the road hedgerow or shelterbelt acts as a congregation area and barrier (Graph 5 and 6) The horn fly and little house fly populations are significantly higher along the hedgerow than within the two adjacent farms. Therefore the road hedgerow acts a barrier or filter on migrating flies, decreasing the populations invading Messer's farm location. Negatively, it may also act as a barrier in keeping the flies from moving out from the Messer's farm. An important point is that the shelterbelt can be used as an interim buffer control until an integrated manure/ fly abatement program is established.

The relatively low fly populations of the 4 dominant species collected at Dierker's barn area presently supports Terry Dierker's belief that his dairy operation does not have a major nuisance fly problem. This may explain the conflicting opinion of breeding fly sources and nuisance fly levels.

DAIRY OPERATION FLY CONTROL EFFECTIVENESS USING DIMETHOATE & PERMETHRIN; JULY 19 - 20, 1988

LOCATION	DOMINANT FLY SPECIES	FLY POPULATION PRECENTAGE DIFFERENCES			
		HF	LHF	HOF	GF
OUTSIDE DIERKER'S BARN (D.T.)	HOF, HF, LHF, GF	85% <	47% >	99% <	97% <
INSIDE DIERKER'S BARN (P.T.)	LHF, HF, HOF, GF	69% >	70% <	88%<	0 %
ROAD HEDGEROW (E &W); (D.T.)	LHF, HOF, GF, HF	36% <	40% <	48% <	96% <
N.E. SIDE MESSER'S HOME; (N.T.)	LHF, HF, GF, HOF	50% >	42% <	100% <	80% <
S.W. SIDE MESSER'S HOME; (N.T.)	LHF, GF, HF, HOF	62% <	61% <	100% <	100% <

LEGEND

D.T. - Dimethoate treatment
P.T. - Permethrin treatment
N.T. - Non treatment
HOF - Horn fly
HF - House fly
LHF - Little House fly
GF - Garbage fly
< - Decrease
> - Increase

The results of the treatment (above chart) shows an overall effectiveness of dimethoate (yardsite and shelterbelt) and permethrin (in barn) in controlling flies. The demonstration of the electrostatic sprayer proved to be a cost effective and practical means of on farm control of nuisance flies. The road hedgerow was treated with the recommended dosage rate of dimethoate (Cygon) in a 35 minute time period. The outside and inside of the barn was sprayed with dimethoate and permethrin, respectively, in a 55 minute time period, with minor technical difficulties.

The fly population percentage increases do not necessarily indicate ineffective insecticidal control, but the possible immigration and hatching of new flies into the designated locations (Abbott, 1925). Increasing the post treatment fly populations over and above the pre treatment fly population levels.

CONCLUSIONS AND RECOMMENDATIONS

The little house fly population was decreased, on the average, by 50 % . (Graphs 7 to 10). Low mortality at the road hedgerow indicates either ineffective insecticidal control or fly population increase or both (Graph 5 and 6). There was very effective control of horn fly populations within the two adjacent farms and hedgerow (Graphs 5 , 6, 11 and 12).
The project was successful in establishing a nuisance fly status and demonstrating effective fly control by utilizing an electrostatic sprayer with the insecticidal products, dimethoate and permethrin. It also provided background information for the establishment of nuisance fly abatement program quidelines.
Preliminary results of this project initiated several manure management and fly abatement recommendations. on August 15, 1988, the project evaluator and Howie Bjorge, Administrator with Saskatchewan Agriculture, Livestock branch issued Fly Control Management procedures to the two farmers participating in the project.

The following management alternations and procedures were recommended;

Immediate Physical Alternations

1. Relocate silage storage to area North-east of barn

2. Relocate winter manure storage to field East of Dierker's farm
3. Establish new shelterbelt in Dierker's yard parallel to road hedgerow
4. Cover septic outlet in road hedgerow with black plastic

Continous Operating Procedure

1. Dairy Barn - clean free stalls daily
   - watch for manure build-up at north of barn entrance and remove
   - monitor sticky traps weekly
2. Feeding Area - Remove manure October and early May
3. Shelterbelts - Spray with Cygon and/ or Fenthoin as needed during May through July
4. Winter Manure Storage - Clean completely and spread by May 15

One minor issue that was not incorporated into the management procedures, but warrants attention, is that of the leaky watering bowl. The moist conditions are enhancing fly congregation inside and outside the barn.

Two issues that need further investigation are the locating of the little house fly breeding areas (septic tank outlet) and the control of the horn fly population. Pin-pointing the exact breeding locations of the little house fly will streamline manure management activities and fly abatement activities. Control of the resident horn fly population could increase milk production and make the dairy animals easier to handle.

ACKNOWLEDGEMENT:

This project was funded under the ~~Federal - Provincial Economic Regional~~ Saskatchewan Agriculture Development ~~Agreement~~ Fund (~~E.R.D.A.~~ ADF). The contributions of Mr. and Mrs. Terry Dierker, (Tisdale); Mr. and Mrs. Jack Messer (Tisdale); Ms Carol Elian, (Saskatoon); Administrator, Howie Bjorge, (Regina); Agriculture Engineer, Bill Henley, (Tisdale); Livestock Specialist, Jim Armstrong, (Tisdale) and Dr. Dennis Lehmkuhl (Saskatoon) is appreciated.

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Abbott, W.S. 1925. A method for computing the effectiveness of an insecticide. Journal of Economic Entomology. 18: 265-267

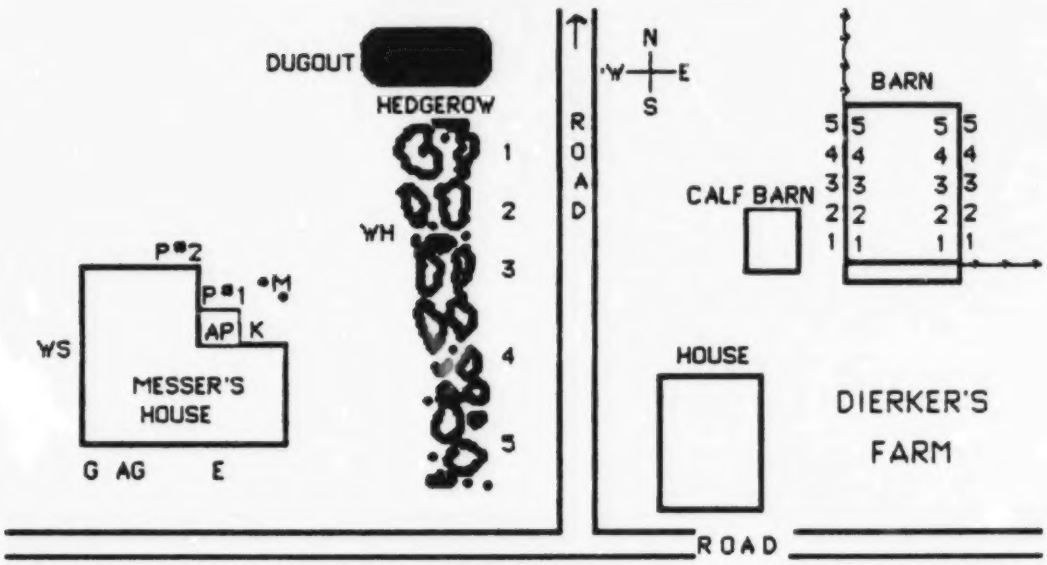
Axtell, R.C. 1986. Fly control in confined livestock and poultry production, CIBA - GEIGY. 31-47

Legner, E.F., W.R. Bowen, W.D. McKeen, W.F. Rooney. & R.F. Hobza 1973. Inverse relationship between mass of breeding habitat and synanthropic fly emergence and the measurement of population densities with sticky traps in California inland valley. Environmental Entomology. 2: 199-205

Diagram #1

TERRY DIERKER
DAIRY OPERATION FLY CONTROL
A.D.F. Demonstration

Study Area and Monitor Site Locations



LEGEND

MONITOR SITE LOCATION	MONITOR SITE LOCATION	# OF TRAPS	DATA # (see table 1 & 2)
Barn 4 sets of 1-5	Outside Barn East	5	1 to 5
	Inside Barn East	5	11 to 15
	Inside Barn West	5	16 to 20
	Outside Barn West	5	6 to 10
Hedgerow 1-5	Road Hedge East	5	21 to 25
	Road Hedge West	5	26 to 30
WH	Westside of Hedge	2(in/out)	31 & 32
M	Midway of House & Hedge	2(in/out)	33 & 34
K	Kitchen	2(in/out)	39 & 40
AP	Above Patio	1	41
P#1	Patio Site #1	2(in/out)	35 & 36
P#2	Patio Site #2	2(in/out)	37 & 38
WS	Westside of House	2(in/out)	47 & 48
G	Garage Door	2(in/out)	45 & 46
AG	Above Garage Door	1	44
E	Entrance to House	2(in/out)	42 & 43

DAIRY OPERATION FLY CONTROL

Table 1

Cricket Graph Data

Pre July 19 ,1988 Treat

Tue, Mar 7, 1989 10:13 PM

	Location	Housefly	LessHousefly	Hornfly	Garbagefly
1	Out barn East	7	0	4	0
2	Out barn East	6	3	14	3
3	Out barn East	6	3	36	0
4	Out barn East	1	7	38	0
5	Out barn East	23	10	60	11
6	Out barn West	19	2	27	10
7	Out barn West	9	21	1	0
8	Out barn West	1	0	28	0
9	Out barn West	1	2	10	8
10	Out barn West	5	1	9	0
11	In barn East	0	0	0	0
12	In barn East	1	0	0	0
13	In barn East	0	0	0	0
14	In barn East	1	0	1	0
15	In barn East	4	2	5	0
16	In barn West	3	0	1	0
17	In barn West	1	1	1	0
18	In barn West	0	0	1	0
19	In barn West	1	0	0	0
20	In barn West	3	20	0	0
21	Road Hedge E	2	56	23	0
22	Road Hedge E	5	19	41	6
23	Road Hedge E	8	33	7	1
24	Road Hedge E	3	8	18	7
25	Road Hedge E	4	37	3	2
26	Road Hedge W	3	16	22	3
27	Road Hedge W	0	8	3	3
28	Road Hedge W	0	9	9	0
29	Road Hedge W	0	9	5	2
30	Road Hedge W	0	12	6	2
31	W Hedge IN	1	66	0	1
32	W Hedge OUT	1	89	2	0
33	Midway IN	2	23	1	0
34	Midway OUT	0	23	0	0
35	Patio #1 IN	0	18	0	1
36	Patio #1 OUT	0	8	0	1
37	Patio #2 IN	1	7	0	0
38	Patio #2 OUT	2	10	0	1
39	Kitchen IN	0	5	0	0
40	Kitchen OUT	1	9	0	0
41	Above Patio	2	7	0	1
42	Entrance IN	1	9	1	0
43	Entrance OUT	2	36	1	0
44	Above Garage	3	9	0	0
45	Garage IN	3	2	1	0
46	Garage OUT	8	66	1	0
47	West Side IN	0	15	0	20
48	West Side OUT	4	39	3	2

DAIRY OPERATION FLY CONTROL

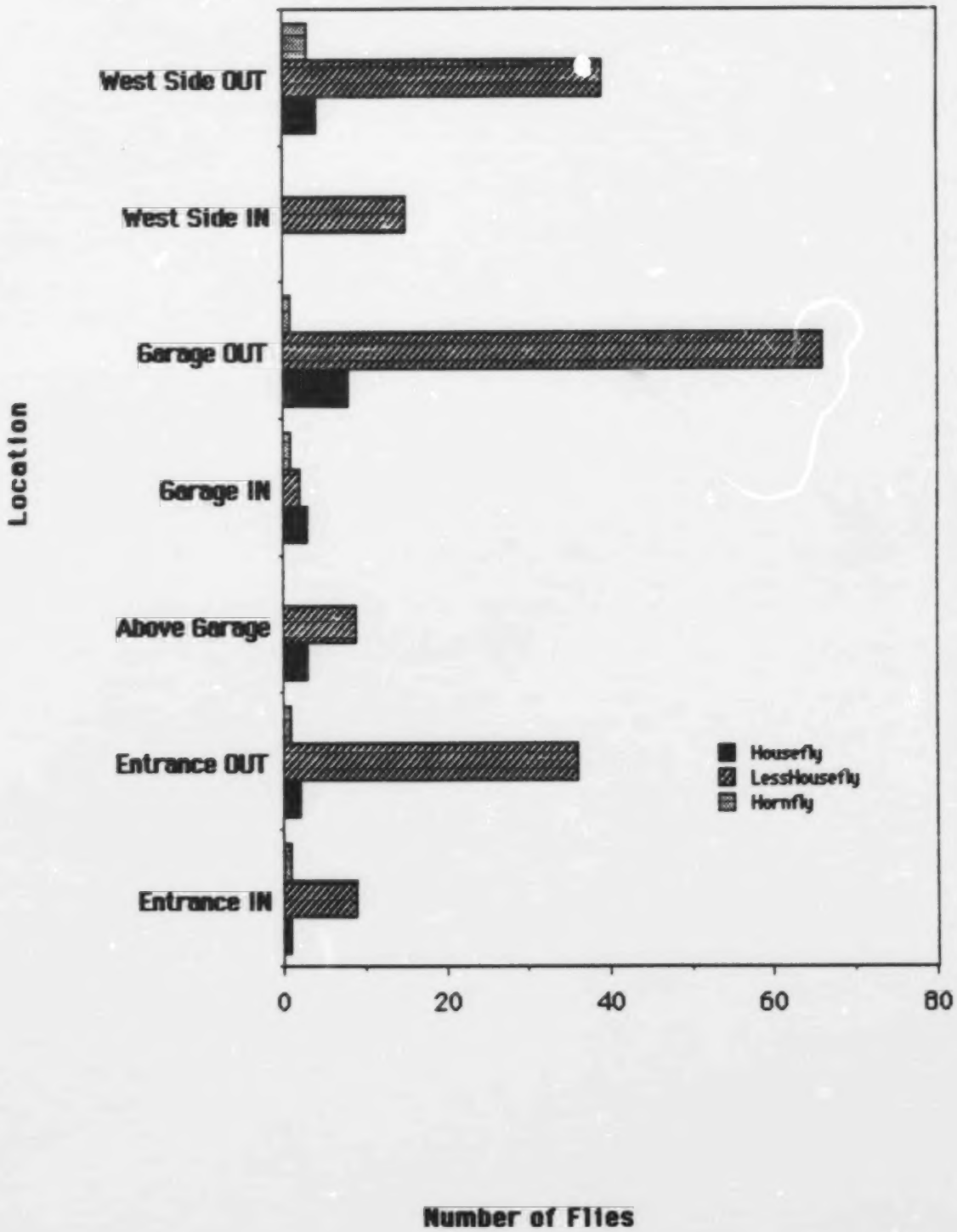
Table 2

Cricket Graph Data — Post July 20, 1988 Treat — Tue, Mar 7, 1989 10:07 PM

	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
1	Out Barn East	3	3	0	0	
2	Out Barn East	2	12	0	0	
3	Out Barn East	2	21	0	1	
4	Out Barn East	0	9	0	0	
5	Out Barn East	0	9	0	0	
6	Out Barn West	0	1	1	0	
7	Out Barn West	0	1	0	0	
8	Out Barn West	3	1	0	0	
9	Out Barn West	1	6	0	0	
10	Out Barn West	1	9	0	0	
11	In Barn East	4	0	0	0	
12	In Barn East	1	0	0	0	
13	In Barn East	3	0	0	0	
14	In Barn East	3	0	0	0	
15	In Barn East	3	5	1	0	
16	In Barn West	17	0	0	0	
17	In Barn West	5	1	0	0	
18	In Barn West	1	0	0	0	
19	In Barn West	4	0	0	0	
20	In Barn West	5	1	0	0	
21	Road Hedge E	2	33	0	0	
22	Road Hedge E	1	10	11	0	
23	Road Hedge E	1	17	3	0	
24	Road Hedge E	1	11	8	0	
25	Road Hedge E	5	12	6	1	
26	Road Hedge W	0	3	1	0	
27	Road Hedge W	1	9	9	0	
28	Road Hedge W	1	10	5	0	
29	Road Hedge W	0	7	9	0	
30	Road Hedge W	4	12	5	0	
31	W Hedge IN	2	22	0	0	
32	W Hedge OUT	4	29	0	0	
33	Midway In	0	12	0	0	
34	Midway Out	0	11	0	0	
35	Patio #1 In	1	13	0	0	
36	Patio #1 Out	1	18	0	0	
37	Patio #2 In	0	6	0	0	
38	Patio #2 Out	0	14	0	0	
39	Kitchen In	1	16	0	0	
40	Kitchen Out	1	4	0	0	
41	Above Patio	5	8	0	1	
42	Entrance In	2	6	0	0	
43	Entrance Out	2	16	0	0	
44	Above Garage	0	3	0	0	
45	Garage In	0	4	0	0	
46	Garage Out	3	12	0	0	
47	West Side In	0	12	0	0	
48	West Side Out	1	16	0	0	
49						

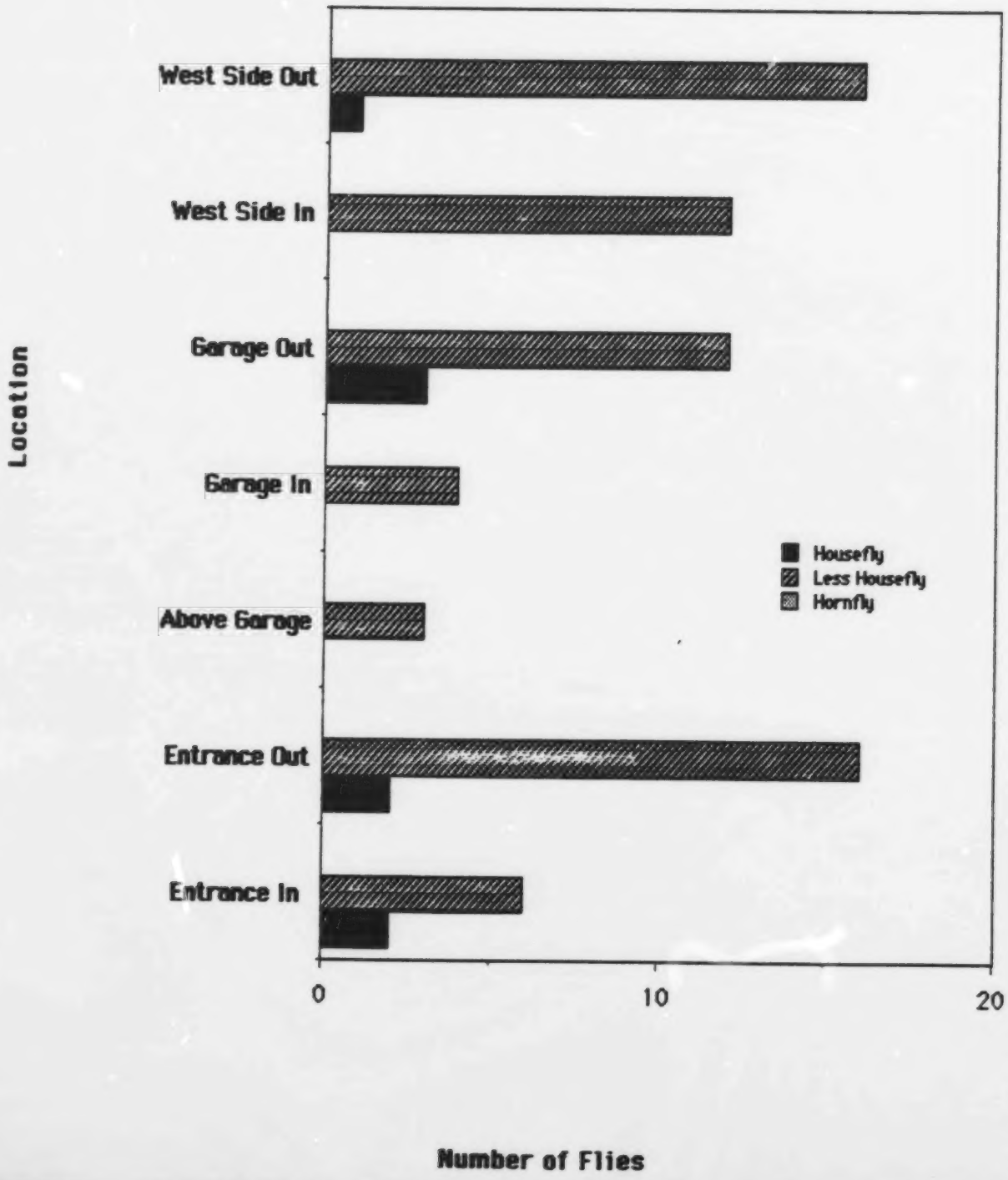
GRAPH 1

Pre Treatment: Fly Distribution at S.W. Side of House, July 19, 66



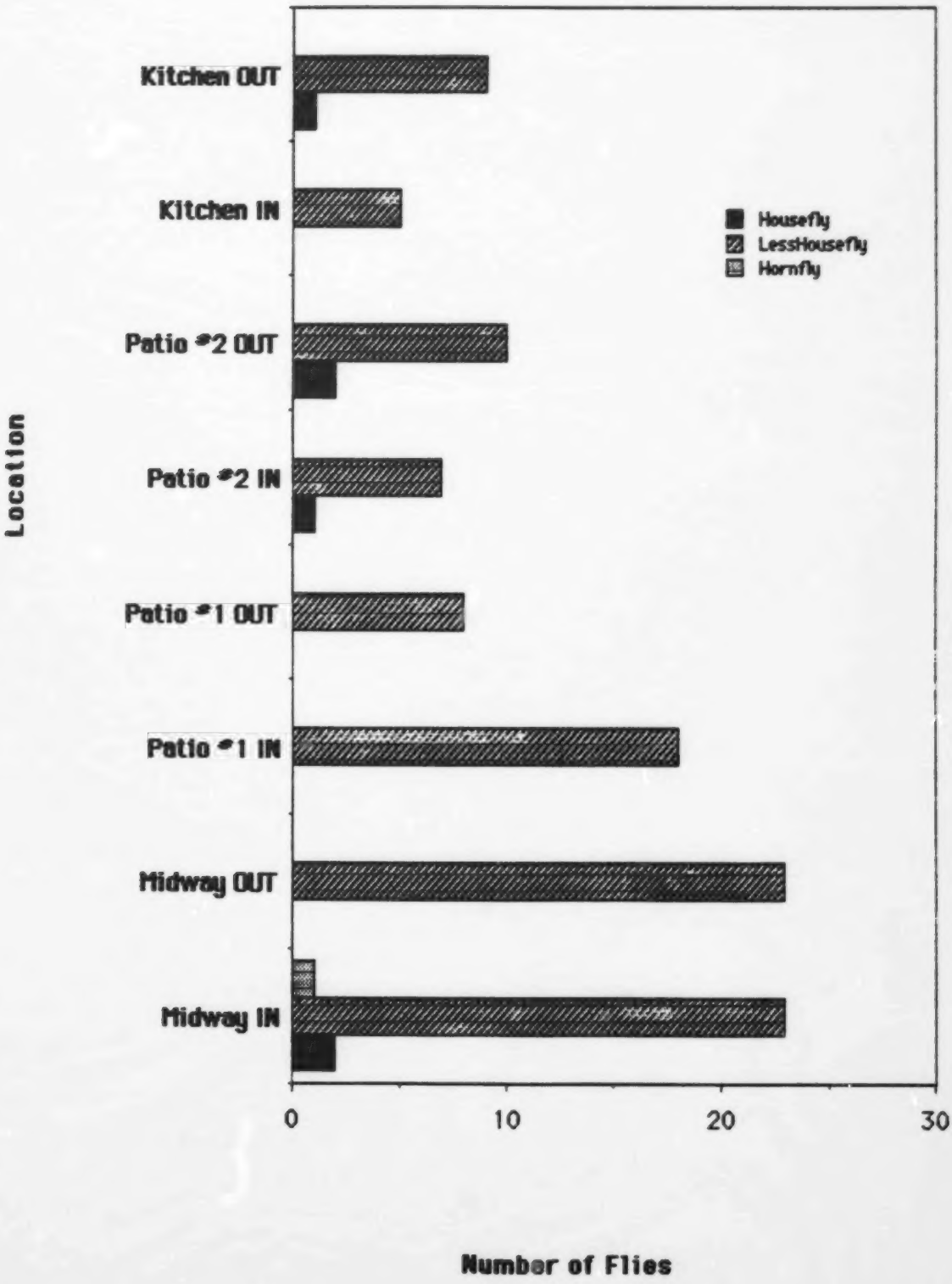
GRAPH 2

Post Treatment: Fly Distribution at S.W. Side Of House, July 20, 66



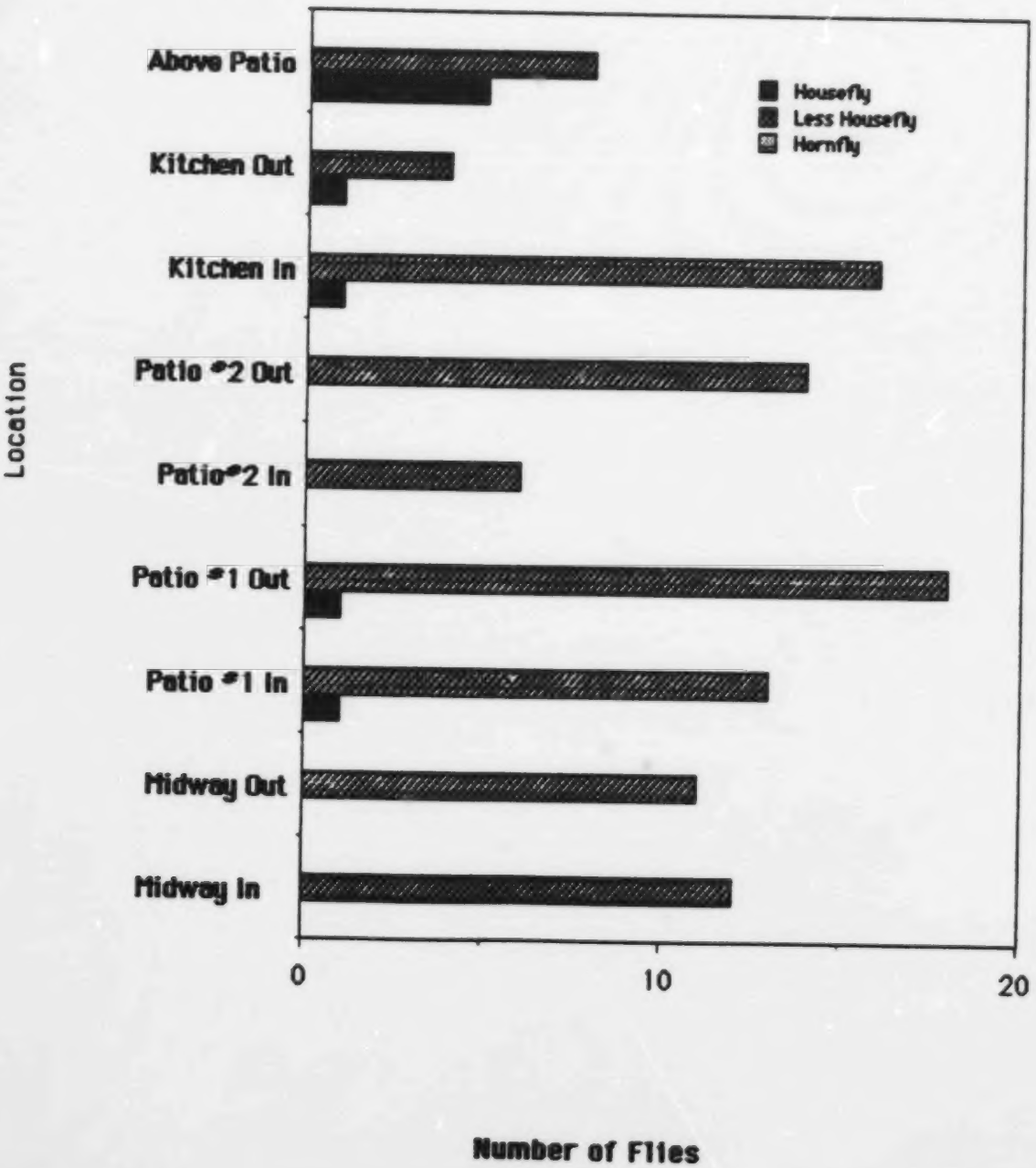
GRAPH 3

Pre Treatment: Fly Distribution at N.E. Side of House, July 19, 88



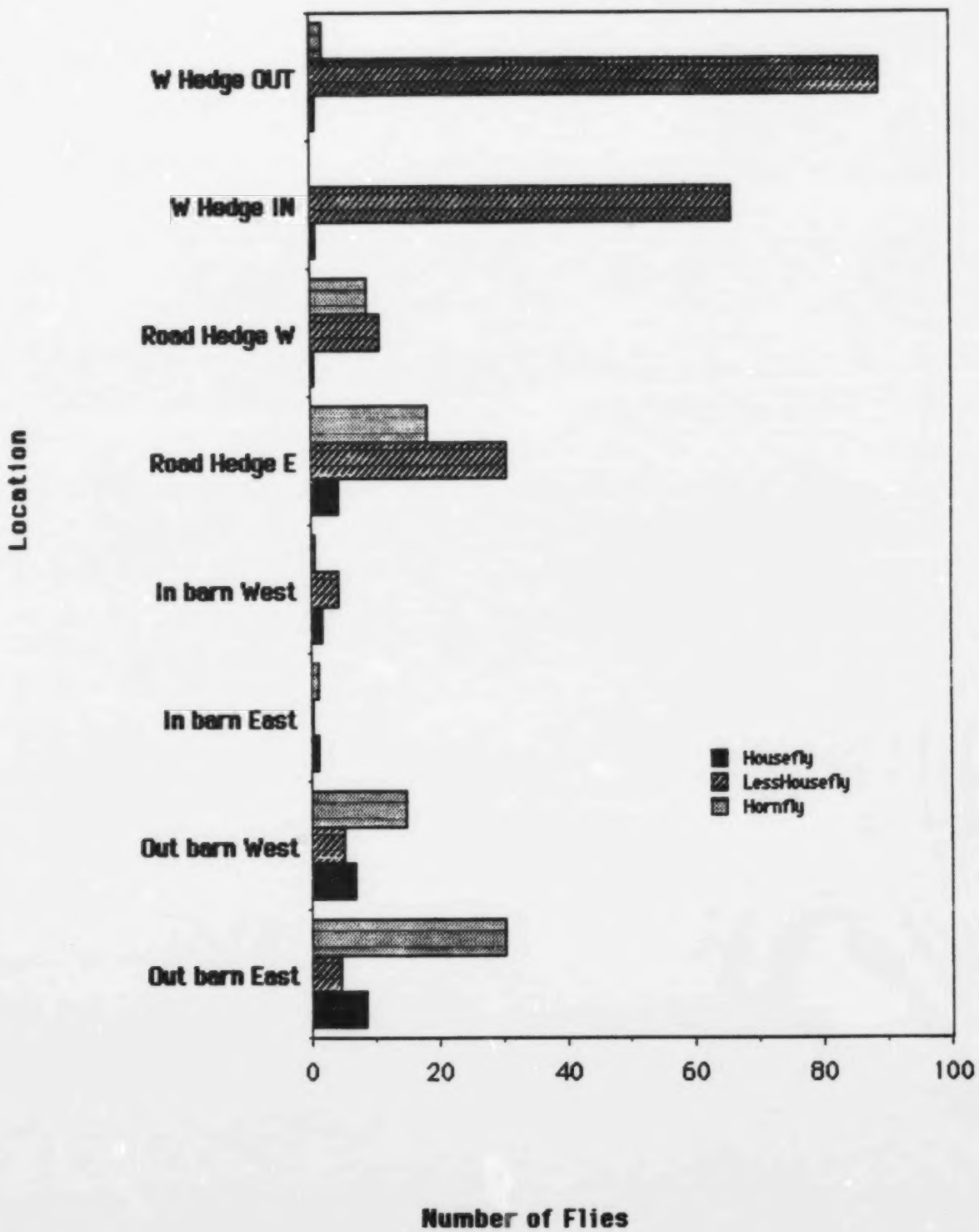
GRAPH 4

Post Treatment: Fly Distribution on N.E. Side of House



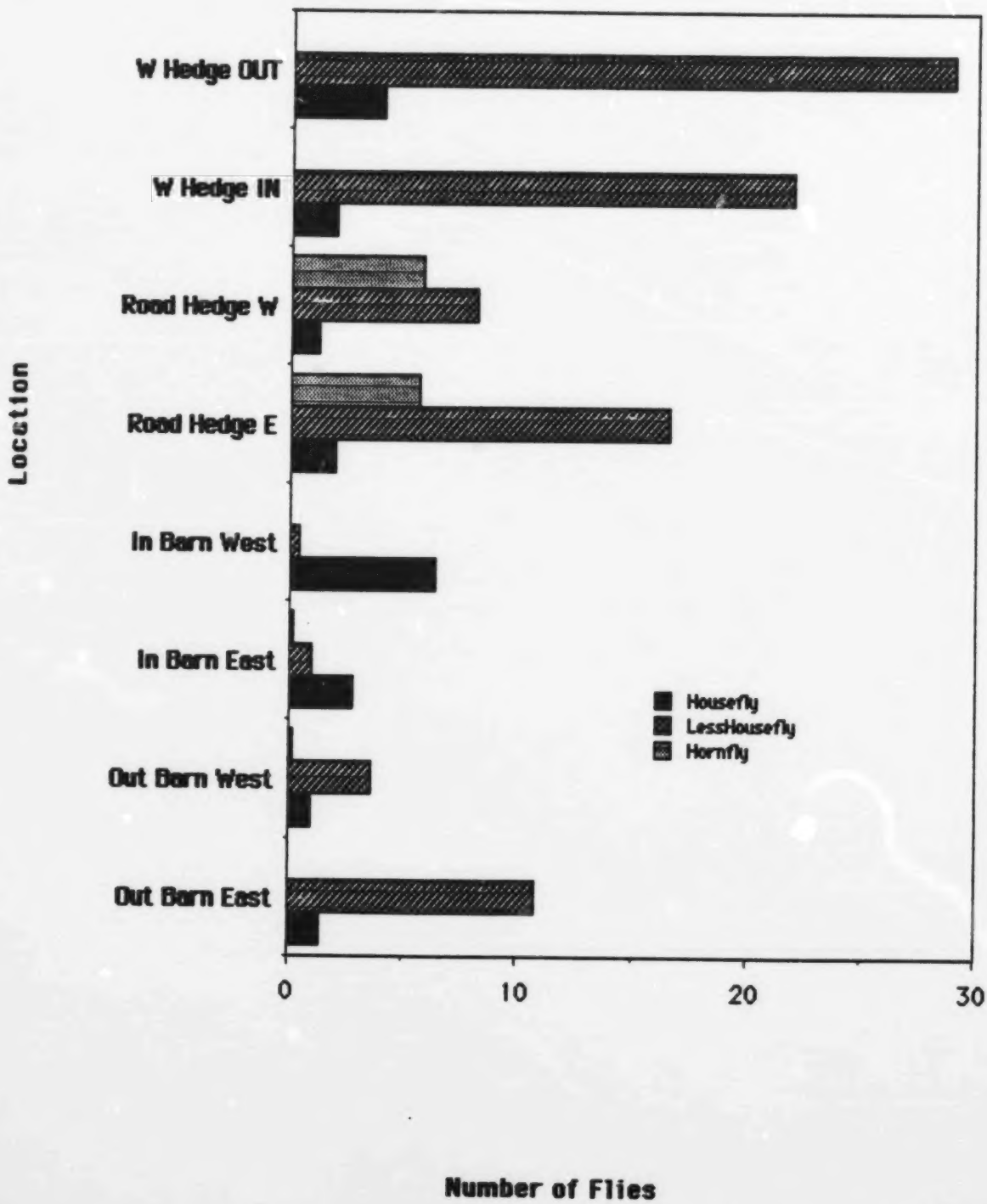
GRAPH 5

Pre Treatment: Fly Distribution at Barn and Hedgerow, July 19, 1988



GRAPH 6

Post Treatment: Fly Distribution at Barn and Hedgerow, July 20, 1988



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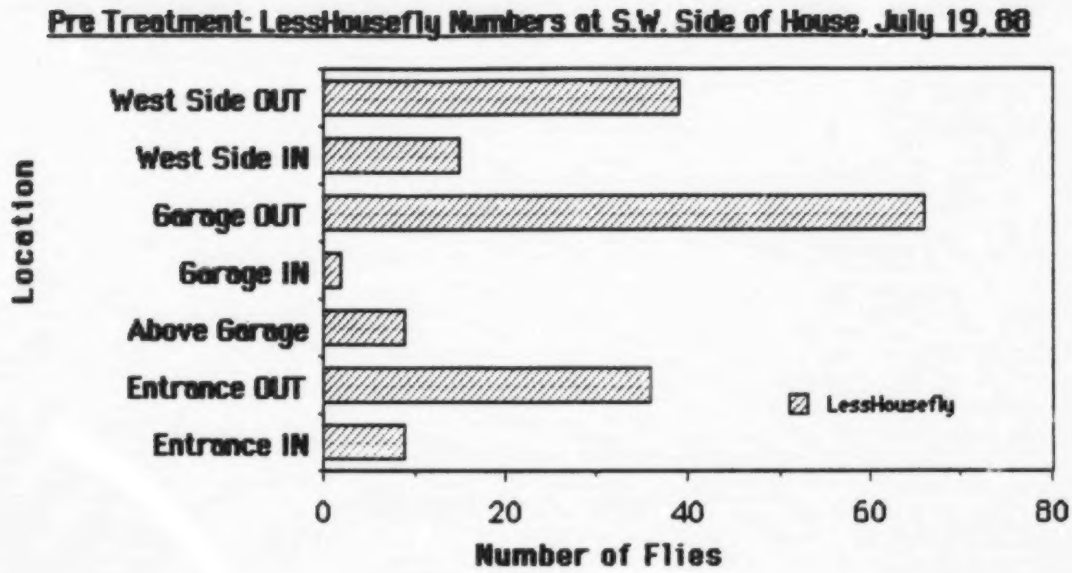

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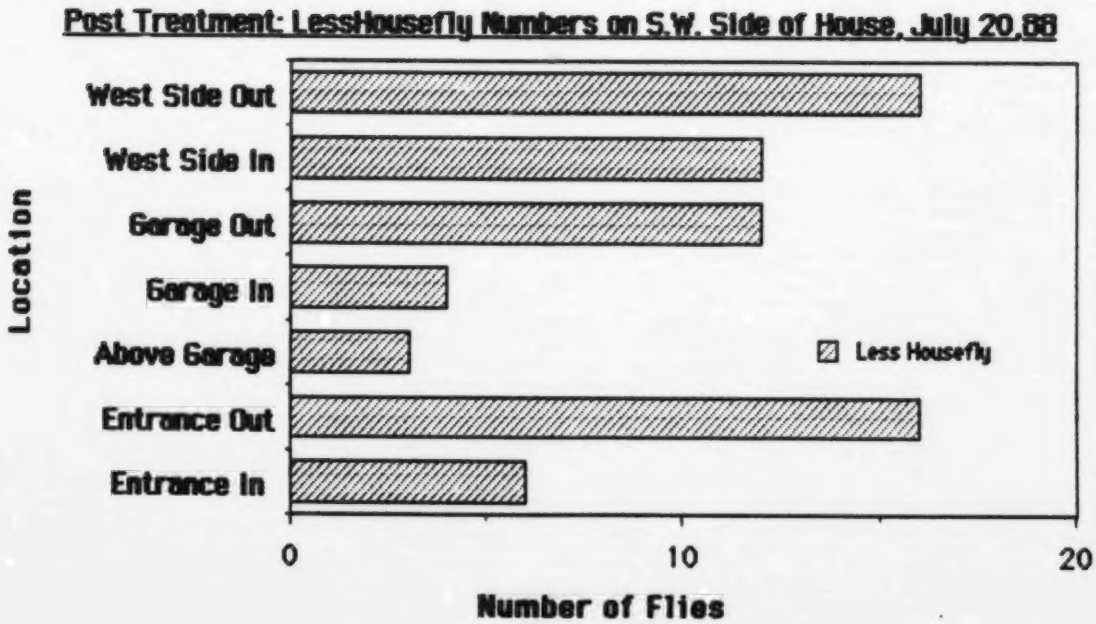

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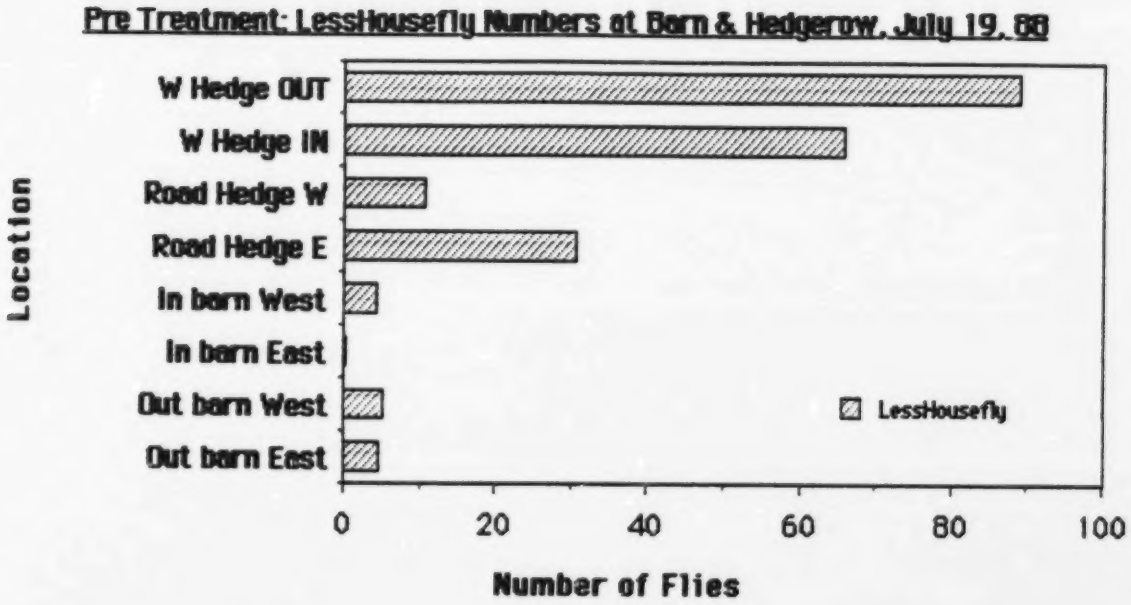

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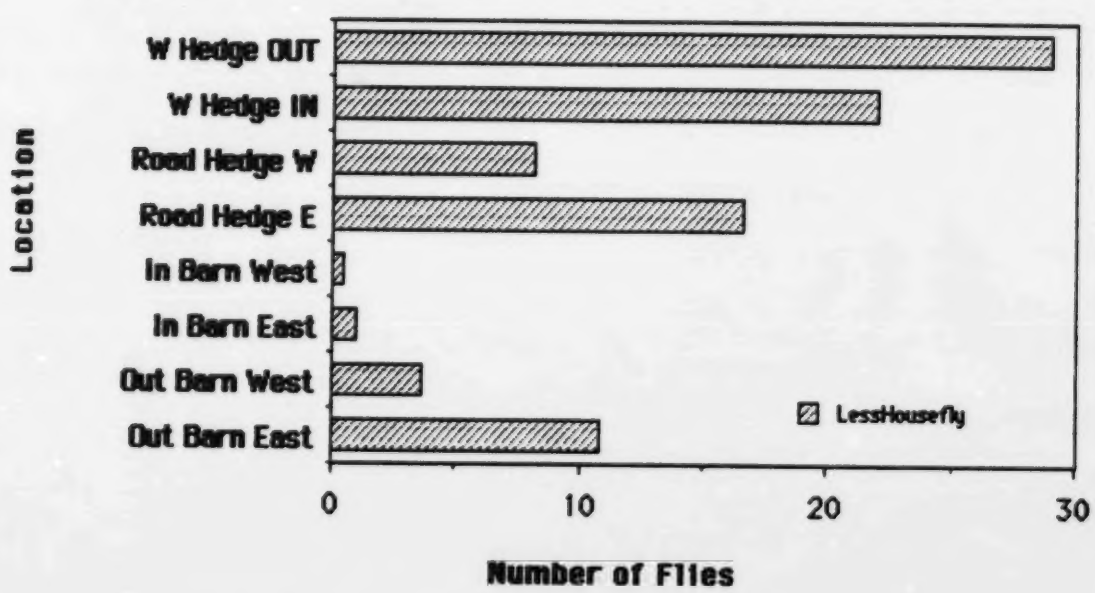
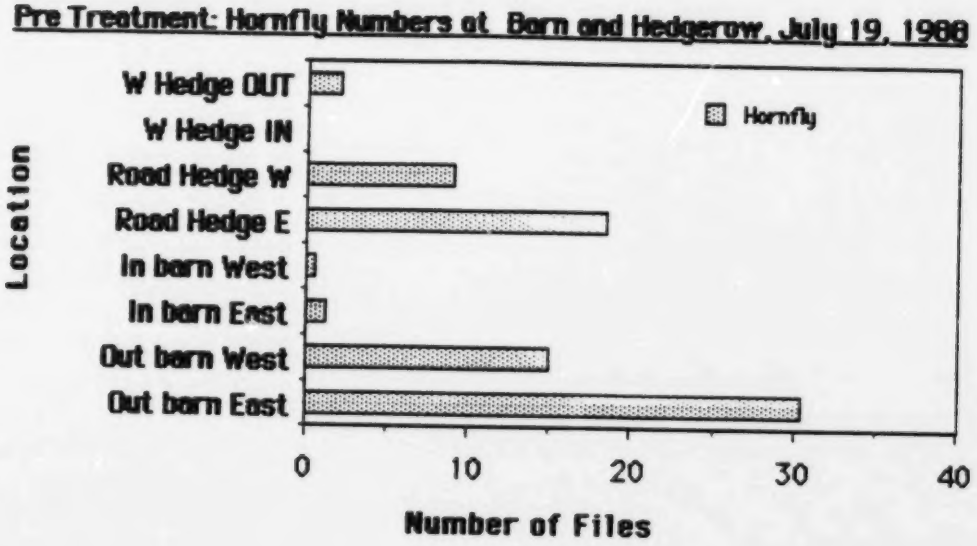


GRAPH 11



GRAPH 12